



# Breaking Bad Habits: The Negative Effect of Email and Instant Messaging on the Workplace

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The use of electronic messaging has grown rapidly in recent years as it enables us to communicate in ways that we have not been able to in the past. Although its ease of use, quickness, and ability to reach many individuals at one time make it attractive communication medium, these characteristics can lead to negative consequences. This paper highlights the problems with electronic messaging in the workplace and shows what can be done to increase employee communication effectiveness, in terms of changing the way employees work and how the next generation of electronic messaging applications will enable employees to become more productive.

## 1. INTRODUCTION

It has long been clear that email is more than just a simple communication system<sup>[1-2]</sup>. Email has become a central element of the way work is conducted in organisations where computers are used. It is now the source of many different office tasks, serving as the place in which work is received and delegated<sup>[3]</sup>. For today's computer user at work, email is much more than an ordinary application. It has become a part of the working habitat<sup>[4]</sup>. Today there are currently 34 million people in the US that have access to the Internet<sup>[5]</sup>. The International Data Corporation (IDC) has predicted that 35 billion emails will be sent every day by 2005. At the end of 2002, the figure stands at 14 billion. IDC's Email Usage Forecast and Analysis report further estimates that the number of emails sent annually in Western Europe will be 1.6 trillion in 2005<sup>[6]</sup>.

Since the introduction of email, which dates back to sometime in late 1971, when a computer engineer named Ray Tomlinson sent the first email message with an "@" symbol, there has been the introduction of a new office communication tool called instant messaging (IM). Instant messaging, once a novelty, is set to take centre stage in the way many of us communicate both at home and at work. About half the USA's major corporations use instant messaging, which lets people converse, virtually in real time, by sending quick missives over the Internet, research firm Gartner Group says<sup>[7]</sup>. The number has doubled the past year and at least some employees at 90% of big companies will use it in the workplace by 2003, Gartner predicts. Currently over 100 million people already use some form of instant messaging software. By 2004, IM is expected to be more popular than e-mail as a method of communication<sup>[8]</sup>. It is therefore no surprise that the big internet companies are at war over this simple service that allows people from all over the world to have text-based conversations with each other in real time.

To date there has been no shortage of corporate interest in instant messaging. More than five billion instant messages were sent using Yahoo in September, up 115% on last year, according to internet tracking company Media Matrix<sup>[9]</sup>. With the likely event that the number of electronic messages sent are set to increase, there still has only been limited research carried out into the effectiveness of email and instant

messaging within the workplace. In the majority of companies, email and instant messaging is thought to be an efficient communication process by both the employees and most importantly employers, but the real impact of using computers to communicate has not been analysed. This is mainly due to the attitude of, "Our competitors are using it and it works well for them". Research conducted by the authors of this paper highlights the problems with email and instant messaging and how it can affect employee effectiveness if the communication medium is not managed correctly.

## 2. THE IMPORTANCE OF EFFECTIVE COMMUNICATION

Effective communication has positive returns and, by executives' own vote, no aspect of a manager's performance is of greater importance to his or her success than communication<sup>[10]</sup>. In the Harvard Business Review article, "What helps or harms promotability?", Garda Bowman (1964) discovers the qualities that characterise promotable executives. She reports that the ability to communicate is at the highest rung (out of 8 rungs) of the ladder to promotion. With the widespread acceptance of computer-mediated communication technology, it stands to reason that the ability to communicate will also reflect the ability to communicate effectively with all types of communication media available.

A problem that some organisations find is that technology often magnifies shortfalls in communication skills<sup>[12]</sup>. Most are not taught how to be effective electronic communicators<sup>[13]</sup> and a constant barrage of less-than-useful email messages disrupts workflow and robs employees of productive time<sup>[12]</sup>. It has been revealed that more than 65% of all messages failed to leave receivers enough information to enable them to act on the message<sup>[12]</sup>. No company can afford such information incompetence<sup>[14]</sup> but, as many studies are discovering, electronic messaging use is growing at an increasing rate. A study by EdWel & Company, a Chicago-based consulting and training firm, discovered that some individuals receive 80 to 100 email messages per day<sup>[12]</sup>. Average email users were said to receive approximately 15 messages per day and spend almost 50 minutes merely reading those messages<sup>[12]</sup>. Though there has been no empirical studies undertaken into the number of instant message interactions an employee receives a day, the authors believe that the figure is about half to that of the number of email messages sent.

## 3. THE EFFECT OF INTERRUPTING THE WORK PATTERN

Apart from having effects on work outcomes, interruptions can also affect the personal state, in particular the emotions of the worker. Already in 1928, Ovsiankina mentioned the existence of negative emotions as a result of interruptions as subjects felt irritated. Mandler, first in 1964 and later in 1975 and 1984, formulated the relation between interruptions and emotions in more detail. He believed that another phenomenon is involved in the interruption process, besides the ten-

gency to complete, namely, an emotional response. This response can direct workers' behaviour and it does not emerge unless an organised response has been interrupted. So far, no study has yet addressed the issue of emotions in interrupted work, although some researchers have acknowledged its importance<sup>[19], [20]</sup>. Nevertheless, it is a common feeling that interrupts are annoying and any research that can lead to a reduction of interruption effects is therefore to be welcomed.

Research carried out by Solingen into communication interrupts showed 15-20 percent of an employee's effort is spent dealing with interrupts and in real terms 15-20 minutes per interrupt<sup>[21]</sup>. An interruption is defined as 'any distraction that makes a developer stop his planned activity to respond to the interrupt's initiator'<sup>[21]</sup>. However, an email interruption is defined as 'any email distraction that makes an employee stop their planned activity'<sup>[22]</sup>, as shown by Figure 1. There were three types of interrupts defined: personal visits, telephone calls and emails. Personal visits and telephone calls caused 90 percent of all interrupts and email caused the rest. The results showed the effort spent on interrupts required approximately 20 minutes for each occurrence, including the time spent handling the interrupt, and that the average developer receives three to five interrupts per day. This consumes roughly 1 to 1.5 hours per day of the developer's time.

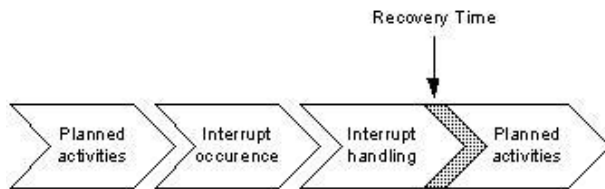


Figure 1 Three Phases of Interruption

DeMarco reported that the recovery time after a phone call interruption is at least 15 minutes, thus increasing the amount of time spent on interrupts a day<sup>[23]</sup>. However, DeMarco's research was carried out using software developers as the subjects. The highly creative nature of a software developer's job means they are likely to require extra time to recover from an interrupt compared to other job roles. This may account for the surprisingly long, 15 minutes recovery time. So far, there has been no reported empirical research into how long it takes to recover from an email interrupt or an instant message. This could be because of the perception of email as causing a minimal interrupt.

#### 4. RESEARCH INTO ELECTRONIC MESSAGING INTERRUPTIONS WITH THE WORKPLACE

In the last four years significant research has been carried out at Loughborough University, funded by the Danwood Group, into the use of email within the workplace and its impact on the employee and their job. The research was conducted by the authors, at the Danwood Group based in the UK, and involved monitoring all the employees' email interactivity including the activities leading up to and after an email interruption<sup>[22]</sup>. The purpose of this research was to determine if email had an interrupt recovery time and this was calculated by recording the amount of time that it took employees to return to their work at the same work rate at which they left it. This required an element of judgment by the person reviewing the recorded material. However, in nearly every case there was a clear point where the user ceased to move the mouse around the screen and jump between screens trying to pick up their train of thought and the production of useful work. Although this may be regarded as a rather inexact measure, the clear change as the user starts productive work means that, in practice, interpretation of the activities by different people would not have given any significant difference in the results. The major findings from the research were:

- All the employees had a new "email arrived" icon appear in the system tray when new email arrived and 57% of the employees also had a new "email arrived" pop-up dialogue box appear.

- It took the employees an average of 1 minute 44 seconds to react to a new email notification by opening up the email application.
- The majority of emails, 70%, were reacted to within 6 seconds of them arriving and 85% were reacted to within 2 minutes of arriving.
- The majority of employees have their email application set to check for email every 5 minutes.
- The time it takes the employees to recover from an email interrupt, and to return to their work at the same work rate at which they left it, was found to be on average 64 seconds.

The results showed that the interrupt effect from emails is more than might be believed. Employees at the company studied allowed themselves to be interrupted almost as frequently (every 5 minutes) as with telephone calls. The common reaction to the arrival of an email is not to delay the response to a time that is more convenient to the user but to react within 6 seconds, again almost as quickly as they would respond to telephone calls. This means the interrupt effect is comparable with that of a telephone call. The recovery time from an email interruption is, at 64 seconds, significantly less than some published recovery times for telephone calls. Therefore while email is still less disruptive than the telephone, the way the majority of users handle their incoming email has been shown to cause far more interruption than expected. The authors are currently undertaken research into instant messaging and the initial results show that employees react to an instant messaging request faster than to a new email. These initial findings indicate that employees are increasingly being interrupted by electronic messaging which can affect the quality of work, employee productivity and more importantly cause message fatigue<sup>[24]</sup>. Armed with this information there is a clear need for organisations to change the communication practices for the majority of their employees to avoid the negative effects of electronic communication. From this research, recommended guidelines were formed to help employers regain employee effectiveness in electronic messaging. A summary of the guidelines are:

- Reduce the prominence of interruptions through turning off the new email alert dialogue box, email sound alerts and pop-up instant messaging dialogue boxes.
- Restrict the use of email-to-all messages, and in particular reply-to-all messages. The use of more targeted email user groups may assist in this respect.
- Set up the email application to display in the inbox the sender, the subject and three lines of the email, so that the recipient can quickly determine if the email requires immediate attention.
- Set up the email application to check for incoming email less frequently. For example, many people find they can benefit from a break in concentration after 45 minutes so the email application should be set to check for incoming mail at intervals of no less than every 45 minutes.
- Introduce training to all staff on how to use the functions within the electronic messaging application, such as setting message priority, email housekeeping with message rules, effective use of user groups and address books, and constructing better structured messages.

#### 5. BUILDING THE NEXT GENERATION OF ELECTRONIC MESSAGING APPLICATIONS

There have been many reports in the recent years that have highlighted concerns with the amount of email and instant messages received and the problems organisations face in the future. Employees not only have to deal with many emails and instant messages a day from fellow co-workers but they also have to manage unwanted email, spam. Nearly 15 percent of emails received each day by US firms contain spam, according to a new survey from the email security company. However, an inability to define what constitutes spam is causing companies problems, the study found. Around three-quarters of respondents in the US predict that spam will be a bigger problem in the year ahead, while just one third of respondents said that unsolicited email wasn't troublesome at present. However, 58 percent of companies said they didn't want to get rid of spam altogether but needed a way to filter relevant emails from unsolicited ones<sup>[22]</sup>.

The emails and instant messages that an employee can receive can range from highly important business messages to spam. At present, regardless of the content of the electronic message, employees are still interrupted which can effect the quality of work and productivity. To improve employee efficiency within the office there is a need to reduce the amount of distractions and when possible eliminate distractions until times of convenience. To achieve this, employers could set employee's electronic message applications to check for messages every 45 minutes or so, but of course employee's can override this, defeating the objective. However, more importantly for the more cautious users who want override the system in place, business messages might not be delivered in time for necessary and appropriate action. To solve these problems the next generation of electronic message applications need to be more sophisticated. Research being undertaken by the authors is attempting to address these needs through constructing an Intelligent Email Classification and Notification Management System using Pattern Recognition (IEMS) as shown in Figure 2, that will determine the importance of an email and when the email message should be delivered to increase employee effectiveness and efficiency.

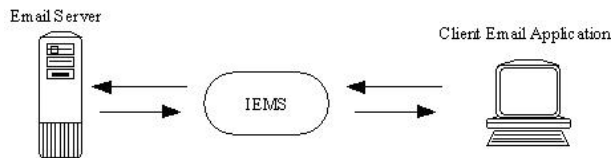


Figure 2 - Proposed System Architecture for the **Intelligent Email Classification and Notification Management System** using Pattern Recognition (IEMS)

The authors hope that the IEMS will be developed further to incorporate instant messaging. The system will then be able to manage all electronic messages and will enable each employee to work more effectively. This new research is crucial to any organisation that interacts with electronic messages to ensure the future survival of these applications, which are undoubtedly fundamental to business, but could become less so if not managed correctly.

## 6. SUMMARY

This research has shown the value of measuring communication processes. The analysis of electronic messaging has enabled the effect on employee time to be quantified and has given some surprising results. This has led to a series of recommendations that will enable organisations to make better use of email communication and increase employee effectiveness. The research has also highlighted the need for organisations to invest in improving their management of electronic messaging systems if they are to have effective and efficient employees. Future development to electronic messaging applications requires more emphasis on intelligent agents to aid employees in managing their electronic messages. Without these future developments, electronic messaging will become much less effective and may deter employees from using such systems, which in-turn could lead to a poor communications within the organisation.

## REFERENCES

1. Mackay W. 1998. "More than just a communication system: Diversity in the use of electronic mail." Pp. 344-353 in *Computer-Supported Cooperative Work*. New York: ACM.
2. Whittaker S., and Sidner C. 1996a. "Email Overload: Exploring Personal Information."
3. Whittaker S., and Sidner C. 1996b. "Email overload: exploring personal information management of email." in *CHI-96 Conference Proceedings*. Boston, MA.
4. Bellotti V., and Smith Ian. 2000. "Informing the Design of an Information Management System with Iterative Fieldwork." Pp. 227-237 in *ACM Conference on Designing Interactive Systems (DIS)*,
5. Nua Internet. 2002a. "On-Line Demographics." [http://www.nua.com/surveys/how\\_many\\_online/europe.html](http://www.nua.com/surveys/how_many_online/europe.html)
6. Mahowald Robert P., Levitt Mark. 2002 "Worldwide Messaging Applications Forecast and Analysis, 2002-2006: Getting the Message Out", <http://www.idc.com/getdoc.jhtml?containerId=27745>
7. Davidson, Paul "Instant messaging: A powerful business tool", USA TODAY, 10/23/00, <http://www.usatoday.com/life/cyber/tech/review/crh643.htm>
8. Hardy, Ian, "Messaging in an instant", BBC News Online, <http://news.bbc.co.uk/1/hi/sci/tech/1531112.stm>, Sunday, 9 September, 2001
9. BBC News Online, "Yahoo enhances instant messages", [http://news.bbc.co.uk/1/hi/entertainment/new\\_media/1613221.stm](http://news.bbc.co.uk/1/hi/entertainment/new_media/1613221.stm), Monday, 22 October, 2001
10. Fielden. 1980. *HBR* March:28.
11. Bowman Garda. 1964. "What helps or harms promotability?" *Harvard Business Review* January-February:14.
12. Frazee V. 1996. "Is e-mail doing more harm than good?" *Personnel Journal* May.
13. Nantz K.S., and Drexel C.L. 1995. "Incorporating electronic mail into the business communication course." *Business Communication Quarterly* 58:45-51.
14. Davenport T.H. 1997. *Information Ecology*. New York: Oxford University Press.
- 15.
16. Ovsiankina M. 1928. "Die widaufnahme unterbrochener Handlungen." *Psychologische Forschung* 11:302-379.
17. Mandler G. 1984a. *Mind and Body*. New York: W.W. Norton & Company.
18. Mandler G. 1984b. *Mind and Emotion*. New York: John Wiley & Sons, Inc.
19. Briner R.B. 1995. "Beyond stress and satisfaction: understanding and managing emotions at work." . un pub
20. Pekrun R., and Frese M. 1992. *Emotions in work and achievement*. Chichester: John Wiley.
21. Solingen R., Berghout E., and Latum F. September/October 1998. "Interrupts: Just a Minute Never Is." *IEEE Software* 15:97 - 103.
22. Jackson T.W., Dawson R., and Wilson D. 2001. "The Cost of Email Interruption." *The Journal of Systems & Information Technology* 5:81-92.
23. DeMarco T., and Lister T. 1999. *Peopleware. Productive Projects and Teams* 2nd Ed. New York: Dorset House Publishing Company.
24. Zijlstra Fred R.H., Roe Robert A., Leonora Anna B., Krediet Irene. 1999. "Temporal factors in mental work: Effects on interrupt activities." *Journal of Occupational and Organizational Psychology* 72:163-185.

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